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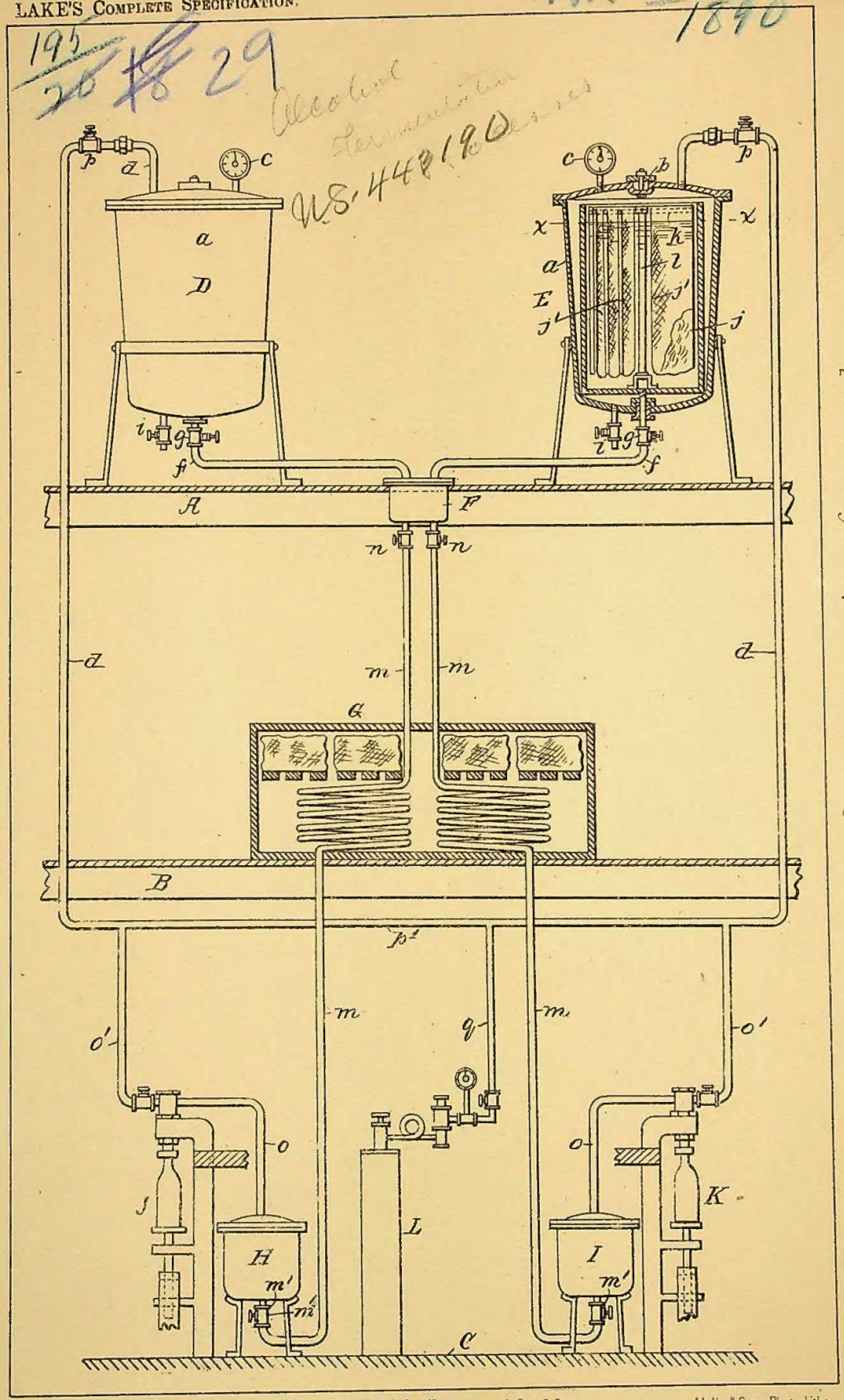
LAKE'S COMPLETE SPECIFICATION.

Bn. 20985 (1 SHEET) 1890

1891



[This Drawing is a reproduction of the Original on a reduced scale]

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COMPLETE SPECIFICATION.

[Communicated from abroad by HERMANN GÖTTER, of Jersey City, United States of America.]

Improvements relating to the Manufacture of Fermented Liquids and to Apparatus therefor.

I, HENRY HARRIS LAKE, of the firm of Haseltine, Lake & Co., Patent Agents, 45, Southampton Buildings, in the County of Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

Heretofore the fermentation of wine has been accomplished in bottles and in vats, requiring a long time for its accomplishment.

It has been proposed to hasten or facilitate the operation by introducing into the wine, paper-pulp, cotton, hemp chopped hay and grape skins to afford nutriment for the minute organisms of the ferment. But the process as so conducted has thus far proved unsatisfactory, because the presence of the substances named has been found to produce chemical changes affecting injuriously the flavor and bouquet of the wine.

I have discovered a process by which the fermentation of even a sparkling wine may be accomplished in five or six days without impairing the qualities of the wine. This discovery consists of the fact that the presence in the wine undergoing fermentation, of a substance presenting to the wine a great area of contact, will hasten the fermentation, although the composition of the substance be such that it is substantially inert in the surroundings and conditions to which it is submitted and therefore sets up no changes which are injurious to the qualities of the wine in flavor or bouquet.

This discovery having been once made, it is evident that it may be utilized by means of a wide range of substances, all of them in this process possessing properties equivalent to those which I am about to name, and I therefore do not desire to be understood as limiting myself to any particular example of the class. I have utilized my discovery by means of the immersion into the wine of spun glass, or asbestos cloth which, by reason of their fibrous or porous nature afford a great surface contact to the wine and at the same time are lacking in these properties which set up other changes in addition to fermentation, and in this sense may be said to be substantially inert.

I have furthermore discovered that the same substance may be used over and over again in the fermentation of successive batches of liquid and that up to a certain point, its efficiency will increase ; but that beyond such point, which may be detected by the substance emitting a disagreeable odor, the use of the same substance will impair or injure the quality of the wine unless it be cleansed, when its efficiency will be continued.

I have also discovered that the substance which is immersed in the wine, to accomplish the best results, should be distributed to all parts of the vat containing the wine.

I will now describe the process more in detail in connection with an apparatus by which it may be practised and which is illustrated in the accompanying drawing.

In the apparatus shown the vats are hermetically closed so as to be adapted for the fermentation of sparkling wine. A, B and C represent three different floors upon which different parts of the apparatus may be located, though this arrangement is not essential ; but it is generally preferred for economy of room and facility of increasing the capacity of the apparatus at any time desired. D and E are vessels within which the fermentation may be accomplished, one shown in side

view and the other in section; they are similar in construction and may be multiplied to any extent if it be desired to increase the capacity of the apparatus.

F is a receiver by which the fermented wine from the various fermenting vessels is received and distributed to the extent required, to the various bottling machines. G is the refrigerator by which the fermented wine is cooled to make it retain a larger proportion of gas. H and I are filters for the clarification of the wine before it is bottled. J and K are the bottling machines. L is a carbonic acid gas machine.

A description of one of the fermenting vessels will suffice for all. *a* is a metallic shell capable of standing an internal pressure of say, at least 120 pounds to the square inch. The top is made removable and is removed for the purpose of cleansing, and for inserting and removing the spun glass, or other material. This vessel is provided with a hand hole *b* which is preferably located at the centre of the top. It is also provided with a pressure gauge *c*. It is also provided at its top with a pipe *d* connected with the various bottling machines. Within the vessel *a* is placed an open vat *e* constructed of some material, as for instance white wood or silver, which will not corrode or in any way injuriously affect the aroma or flavor of the contained wine. From the bottom of this vat, a pipe *f* extends downward through the bottom of the vessel *a*. A packing is provided where this pipe passes through the vessel *a*, to maintain the required pressure within that vessel, and the portion of the pipe *f* which is exposed to the wine is constructed of such material as not to corrode or impair the same. *g* is a valve in the pipe *f* which remains closed until the process of fermentation is completed. Another outlet as at *i* with a suitable valve may be supplied if desired for use when the vat is being washed out with water.

The fermenting vessel E is illustrated as containing spun glass *j* as the material immersed in the wine while undergoing fermentation. In order that this spun glass shall be distributed in all parts of the vat, it is placed in bags j^1 of loosely woven woolen cloth which are suspended from the rods *k* radiating from a central standard *l*. Obviously this supporting mechanism may be varied and would undoubtedly be varied providing other substances should be used in lieu of spun glass; the object in view being, to distribute the substance, whatever it may be, in various parts of the vat.

The pipes *f* leading from the various fermentating vessels all connect with the receiver F. This receiver consists simply of a vessel so constructed as to withstand sufficient internal pressure, and from the bottom of which lead various pipes *m* sufficient in number to correspond with the number of bottling machines, *n* are valves located one in each of these pipes where it leaves the receiver.

The refrigerator may be of any convenient form for cooling the contents of pipes *m* by any of the well known cooling mediums such as ice, cold water or expanded gases to a temperature of 40° Fahrenheit or thereabouts. In the drawing, ice is shown as being placed above the coils formed in the various pipes. From the refrigerator the pipes *m* pass to the bottoms of the respective filters and each pipe is provided with a valve m^1 just below the filter. The filters are of any of the well known constructions in which the wine is compelled to pass through substances calculated to clarify it without imparting any disagreeable qualities.

From the top of each filter a pipe *o* leads to the bottling machine. The bottling machine is of the ordinary construction employed for bottling sparkling beverages and from each bottling machine a pipe o^1 connects with the pipe *d* so as to lead the carbonic acid gas (with which the bottle is charged before being filled with wine, and which passes out of the bottle as the wine enters) back into the fermenting vessel, where this carbonic acid gas occupies the space which was left vacant in the fermenting vessel by the removal therefrom of the wine necessary to fill the bottle. A valve *p* is provided in each pipe *d* adjacent to each fermenting vessel, which valve will be closed excepting when the fermenting vessel is being discharged, so

that the carbonic acid gas from all the bottles being filled will be returned to the fermenting vessel which is being discharged.

The carbonic acid gas generating machine L is connected by pipe *q* with pipe p^1 so as to ensure the maintenance of the proper pressure of gas in the pipes connected with the fermenting vessels.

The process is conducted as follows:

The pipes, receiver and filters leading from the fermenting vessels are filled with water to exclude the air. The spun glass is arranged within the various vats as described and the covers put in place; the hand holes are opened and the vats are filled with wine which is already in process of fermentation (to which a trifle of sugar is added) up to about the level indicated in the vessel E by the line *x*. Above this line the vessel is filled with carbonic acid gas, so that no air is left in contact with the wine. The hand hole is then closed and the temperature of the room is maintained at from 70 to 80° Fahrenheit or thereabouts and as nearly uniform as practicable. Under these conditions the pressure gauge will indicate a rise of pressure and when it indicates a pressure of from 75 to 90 pounds per square inch or thereabouts, the fermentation may be considered complete. This may occupy from five to six days or thereabouts. Then the valves *q* and *p* are opened and as many as the valves *n* as it is desired to employ of the bottling machines.

The wine driving the water before it, which may be discharged through the pipe leading to the bottles before the bottles are placed in position, will flow through the receiver, the refrigerator and the filter successively and into the bottles where it replaces the carbonic acid gas, with which the bottles have been previously charged as usual and which passes upward through the pipe *d* into the fermenting vessel. After the contents of one fermenting vessel have been discharged, the valve *p* and *q* may be closed and it may be recharged; and whilst the fermentation is proceeding in it, other fermenting vessels connected with the same separator may be discharged. In this manner the operation of bottling may be conducted continuously; the charging of the various fermenting vessels being so timed as to cause some one of them always to be in condition to be discharged.

After the fermenting vessel has been discharged and before a new charge of wine is inserted, I rinse out the vat and in doing so rinse the spun glass or other substance contained within the vat. This I do by filling the vat with water through the hand hole and agitating the spun glass therein sufficiently to rinse the same and cause sediment formed in the vat to run off with the contained water through the pipe *i*.

The spun glass when new will not be as efficient as after it has been used and the rinsing of it between the successive operations is not sufficient to impair this increased efficiency. After the process has been conducted over and over a great number of times in this manner, the spun glass may however become somewhat foul, as can be detected by the odor which it will emit under such circumstances. When this is discovered, I remove the cover of the fermenting vessel and also the spun glass and wash the interior of the vat and replace the old spun glass by new or by the old spun glass cleansed by washing and heating and then proceed with the process as before.

In making up the first batch with new spun glass or equivalent substance, I have directed wine to be used already in process of fermentation. This, although not absolutely essential will be found expedient to secure economical working on a large scale. In making up subsequent batches with the same spun glass or substance, it is best to also use wine already in process of fermentation, though not so essential as with the first batch.

I do not desire in my claims relating to the process to limit myself to the apparatus shown; nor in my claims for the apparatus do I desire to limit myself to the details thereof since I believe that my invention is broader in its scope than details in either process or apparatus.

In applying the word "inert" to the spun glass or equivalent substances, I do not wish to be understood as asserting that a scientist might not discover some

action unknown to me. I use that term to indicate that it is productive of no action which substantially impairs the qualities of the wine.

By employing the inorganic substances substantially inert toward the beverage in the fermenting vessel, the fermentation is greatly accelerated and without said substance imparting any disagreeable and deleterious taste, flavor or odor to the beverage which injurious effects practice has demonstrated follow the use of cotton, wood and other vegetable substances. By the use however of inorganic substances such objectionable results are obviated and the process of fermentation materially hastened and improved.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is :—

First. The process of producing sparkling wine consisting in submerging in the wine a porous or fibrous inorganic substance which is substantially inert toward the wine and present a large area of contact to the wine, and causing the wine to become charged with gas generated by fermentation in the wine, substantially as described.

Second. The process of fermenting beverages which consists of fermenting the beverage in contact with a porous or fibrous inorganic substance submerged therein and which is substantially inert toward the beverage, substantially as described.

Third. In the art of fermenting beverages the treatment which consists in partially fermenting the beverage and then submitting the same to contact with a porous or fibrous inorganic material substantially inert toward the beverage, substantially as described.

Fourth. The process of producing sparkling wine consisting in bringing the wine into contact with spun glass suspended bodily in a closed vessel from which air is removed and excluded then passing the wine from said vat to a filter and on its way subjecting it to a refrigerating agent and then passing it from said filter to a bottling apparatus, substantially as and for the purposes set forth.

Fifth. In an apparatus for fermenting beverages, a closed vessel provided with an inlet and an exit for wine, and containing spun glass with which wine may be brought into contact to produce fermentation, substantially as, and for the purposes set forth.

Sixth. In an apparatus for fermenting beverages, a closed vessel provided with an inlet and an exit for wine, and containing a porous or fibrous inorganic substance which is substantially inert toward the wine, and with which wine may be brought into contact to produce fermentation, substantially as and for the purposes set forth.

Seventh. In an apparatus for fermenting beverages, a closed vessel provided with an inlet and an exit for wine, an inorganic substance substantially inert toward the wine suspended bodily within said vessel from the upper portion thereof to permit the wine to pass about and beneath said substance, and means for so suspending said inorganic substance, substantially as described.

Eighth. In an apparatus for fermenting beverages, the combination of a series of fermenting vessels, a series of filters, a bottling machine, a receiver located intermediate of the fermenting vessels and filters, pipes leading from all the fermenting vessels to said receiver and separate pipes leading from the receiver to the filters, substantially as and for the purposes described.

Ninth. In an apparatus for fermenting beverages, the combination of a series of fermenting vessels, a refrigerator, a receiver common to all of said fermenting vessels, pipes leading from all of the fermenting vessels to said receiver, separate pipes leading from said common receiver through said refrigerator and to separate filters the filters with which said pipes connect, and a bottling machine connected by pipes to said filters, substantially as described.

Tenth. In an apparatus for producing sparkling wine, the combination of a closed fermenting vessel, a porous or fibrous inorganic substance substantially inert

toward the wine and suspended bodily within said vessel, means for so suspending said substance, a refrigerator to which the beverage is conducted from said vessel, a filter connected with said refrigerator, and a bottling machine connected with said filter, substantially as described.

Dated this 23rd day of December 1890.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, Agents for the Applicant.

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